

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SCB/P61550/001	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/05031	International filing date (day/month/year) 19.11.2003	Priority date (day/month/year) 19.11.2002
International Patent Classification (IPC) or both national classification and IPC C12N13/00		
Applicant C-TECH INNOVATION LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I Basis of the opinion
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 15.06.2004	Date of completion of this report 16.11.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Devijver, K Telephone No. +31 70 340-4124
	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/05031

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-29 as originally filed

Claims, Numbers

1-16 as originally filed

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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EXAMINATION REPORT**

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	5,8,16
	No: Claims	1-4,6,7,9-15
Inventive step (IS)	Yes: Claims	
	No: Claims	1-16
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. CITATIONS

Reference is made to the following documents:

- D1: GB 1217035 A (1970-12-23)
- D2: PAJ vol. 012, no. 467 (C-550) (1988-12-07) -& JP 63188385 (1988-08-03)
- D3: HONGO M ET AL (1986-08) APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 52, no. 2, pages 314-319
- D4: XU T (2001-11-20) DESALINATION, vol. 140, no. 3, pages 247-258
- D5: NOMURA Y ET AL (1987) BIOTECHNOLOGY AND BIOENGINEERING, vol. 30, no. 6, pages 788-793, cited in the application

2. NOVELTY (Art. 33(2) PCT) - INVENTIVE STEP (Art. 33(3) PCT)

- 2.1 Document D1 (cf. pages 1-3 and figure 2) discloses a process for increasing the rate of biocatalysis reactions which comprises applying a direct current (DC) electric field to a reaction mixture, wherein the reaction mixture and the electrodes used to apply said electric field are separated by an ion exchange membrane such that the reaction mixture does not come into contact with said electrodes. The charged organic products in the biocatalysis reaction medium are removed *in situ nascendi* by electrodialysis. D1 anticipates the subject-matter of claims 1-4, 6, 7 and 13-15.
- 2.2 Document D2 (cf. abstract) also discloses the process as mentioned here above and thus anticipates the subject-matter of claims 1-4, 6, 7 and 13-15.
- 2.3 Document D3 (cf. the whole document) discloses a process for increasing the rate of biocatalysis reactions which comprises applying a direct current electric field to a reaction mixture, wherein the reaction mixture and the electrodes used to apply said electric field are separated by an ion exchange membrane such that the reaction mixture does not come into contact with said electrodes. The biocatalysis and electrodialysis stages are operated in separate, but linked, reactors, where

the biocatalysis reaction medium containing active biomass can be circulated continuously to the electrodialysis reactor. The DC current applied is adjusted to control the pH of the reaction mixture. D3 anticipates the subject-matter of claims 1-4, 6, 7 and 9-15.

- 2.4 Consequently, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-4, 6, 7 and 9-15 is not new in the sense of Article 33(2) PCT.
- 2.5 The subject-matter of claims 5, 8 (bipolar ion exchange membrane) and 16 (cultures are immobilised) constitute merely of design options which are at the disposal of the skilled person for carrying out the teaching of the disclosure in D1, D2 or D3. In particular, the overview of D4 (cf. pages 253-255) discloses that bipolar ion exchange membrane water splitting technology provides an ideal complement to the fermentation technology by removing the product acid while simultaneously providing an equivalent amount of base for use in adjusting the pH in the fermenter. Moreover, D5 (cf. the whole document) discloses the same process as disclosed in D3, but using immobilised growing cells. Thus, in the light of the aforementioned prior art, the claimed subject-matter appears not to result in unexpected or advantageous features on which inventive activity could be based and hence, inventive step cannot be acknowledged for the subject-matter of these claims.
- 2.6 Consequently, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-16 does not involve an inventive step in the sense of Article 33(3) PCT.

3. FURTHER REMARKS

- 3.1 The terms "reaction mixture" and "reaction medium" used in the present set of claims leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).